2.1 STUDY AREA DESCRIPTION

2.1.1 NAPA RIVER WATERSHED

The Napa River watershed covers approximately 426 square miles, and is contained by mountains to the north, west, and east. The watershed is typical of the California coastal range with northwest-southeast trending topography. The Napa River runs through the center of the watershed on the valley floor. It drains 48 major tributaries and numerous smaller ephemeral streams on its 55 mile path from the headwaters of Mt. St. Helena in the Mayacamas Mountain range to the San Pablo Bay. Along this route the river winds through varied landscapes of forested mountain slopes, vineyards, urban areas, open pasture, industrial zones, grasslands, marshes, and brackish estuary (NCRCD, 2005).

The Napa River basin is known to contain 27 species of freshwater fish, 14 of which are native and 13 are exotic species that have been intentionally or accidentally introduced (Stillwater Sciences, 2002; Moyle, 2002). Historically, the basin likely supported three salmonid species: chinook salmon, steelhead, and coho salmon; coho salmon are considered extirpated within the basin. Chinook salmon have been sporadically reported in the Napa River since the 1980’s; however no data on run size, timing, or origin have been collected (Pers. comm. J. Emig, 2000). In 2003 and 2004, significant numbers of fall-run chinook salmon were documented in the Napa River and several tributaries (NCRCD, 2005)

In terms of population size and geographic distribution, steelhead are the most significant salmonid species within the watershed. Napa River steelhead populations have been greatly reduced from historical levels. It is estimated that the Napa River watershed supported a population of approximately 8,000 adult steelhead as recently as 100 years ago. The current steelhead population is unknown due to a lack of quantitative data. Recent basin wide surveys estimate the population to be between 200 and 1,000 adult steelhead (Stillwater Sciences, 2002; EcoTrust, 2001). NOAA Fisheries listed steelhead as a threatened species in Napa County in August 1997. Spawning adult steelhead are still documented each year by landowners and agencies, and most tributaries to the Napa River appear to be well seeded with juveniles (EcoTrust, 2001). Despite reduced populations, the Napa River watershed is considered one of the most significant anadromous fish streams within San Francisco Bay (Leidy et al., 2005) (NCRCD, 2005).

2.1.2 YORK CREEK WATERSHED

The Upper York Creek Ecosystem Restoration Project is within the five-square-mile York Creek drainage basin and is located northwest of the city of St. Helena, Napa County, 60 miles north of San Francisco (See Figure 1.1). Figure 2.1 shows York Creek approximately 700 feet upstream of Upper York Creek Dam.

Figure 2.1 York Creek Natural Condition (Approximately 700 feet upstream of Dam).

The upper and larger part of the watershed is located in unincorporated areas of the county while the lower and smaller portion of the basin lie within the city limits of St. Helena. The watershed is sparsely populated mountainous terrain with urbanization accruing downstream of the existing dam area. The watershed is almost entirely privately owned, and vehicle access exists via Highway 29 (Main Street), and Spring Mountain Road in St. Helena. (NCRCD, 2005)

York Creek is a tributary to the Napa River, which flows to the Pacific Ocean via San Pablo Bay. York Creek drains a watershed of approximately 4.4 square miles, originating in the California Coastal Range on the western side of the Napa Valley watershed and ending at the confluence with the Napa River northeast of St. Helena. Elevations range from about 220 feet at the confluence with the Napa River to 2,160 feet in the headwater areas.

Redwoods and mixed conifer forest dominate the riparian corridors in the upper watershed. Mixed hardwood forest and vineyards cover much of the remaining watershed with urban and built up areas in the lower reaches.

Approximately 2.5 miles (4.0 km) upstream from it's confluence with the Napa River, a concrete masonry structure diverts water from York Creek to the City's Lower York Creek Reservoir (Lower Reservoir). The Lower Reservoir, located on an unnamed tributary to York Creek, supplies water for irrigation and other municipal uses and has a capacity of approximately 200 acre-feet.

2.1.3 PROJECT SITE

The 2.1-acre project site is located at Upper York Creek Dam (St. Helena Upper Dam) and Upper Reservoir in York Creek Canyon, approximately 1.25 miles northwest of the city of St. Helena. At an elevation of 570 feet, the earthen dam was completed in 1900 and is composed of approximately 12,670 cubic feet of material that came from soil excavated on site to create the three-acre Upper Reservoir. The 50-foot-high, 140-foot-long structure once impounded water to form the reservoir, which had a 10-million-gallon storage capacity and was used for municipal water supply. Today, use of the reservoir has been abandoned as it has essentially no capacity due to sedimentation.

Both sides of the dam are faced with basaltic fieldstone riprap. A six-foot-diameter steel intake pipe is located immediately behind the upstream side of the dam and extends vertically down 26 feet to a stone culvert. This culvert is 175 feet long and 3 feet in diameter, and leads to an outlet at the base of the dam's downstream side. The dam features two concrete spillways, one built simultaneously with the dam, and the other constructed in 1933. The original spillway is located on the south side of the dam, whereas the second and larger side channel concrete spillway is located adjacent and parallel to Spring Mountain Road.

Below, Figure 2.2 is a conceptual diagram of the project location. Upper York Creek Dam, Upper York Creek Reservoir, the spillway, and Spring Mountain road are shown.

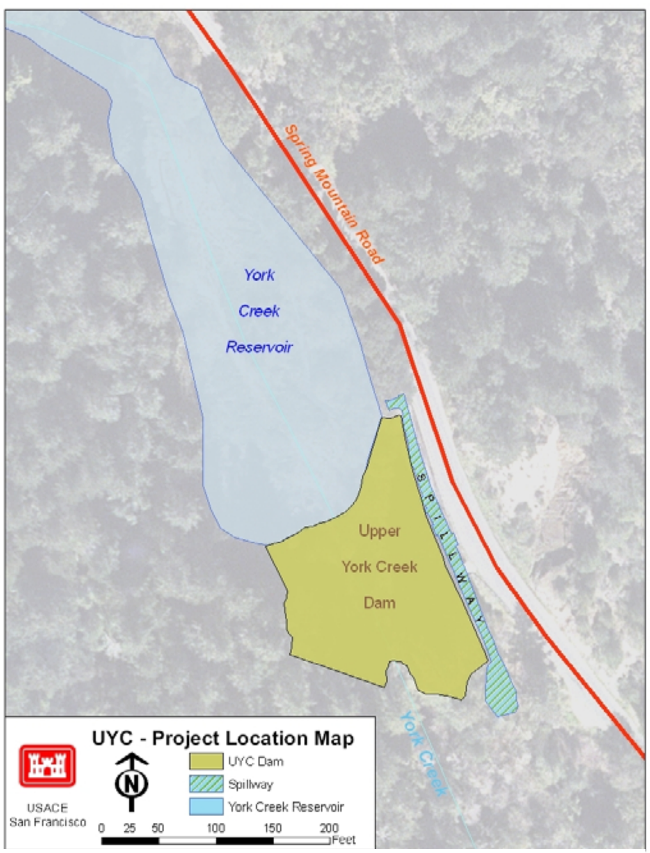

Figure 2.2 Conceptual Diagram of the Project Site.

The below figures are photographs of the reservoir and spillway in dry and storm conditions.

Figure 2.3 Upper Reservoir in dry conditions (November 17, 2005)

Figure 2.4 Upper Reservoir in Storm Conditions. (January 1, 2006)

Figure 2.5 Spillway in dry conditions (November 17, 2005)

Figure 2.6 Spillway in Storm Conditions. (January 1, 2006)

2.2 HISTORICAL WATERSHED USE

2.2.1 COMMUNITY DEVELOPMENT

Settlement of Napa County began as early as 1822, when the area was governed by Mexico. Between then and the Treaty of Guadalupe Hidalgo, which ceded the land to the United States, Americans were granted tracts of land by the Mexican Government in the area. In 1851, 828 acres were organized into Napa County. The Northern half of the county was cut in 1861 and incorporated as part of Lake County. Napa County is now 450,000 acres containing three valleys parallel with the Pacific Coast.

The many opportunities available in the area, as well as the mild climate, drew many immigrants to the area, with the Napa River allowing supplies to be brought in from San Francisco. By 1850, the first steamer was running between Napa City and San Francisco. By the 1870's the county was maintaining a graveled road from Napa City as far as St. Helena. The Napa Valley Railroad Company, Chartered in 1864, had lines running as far as Calistoga by 1867.

With Napa City at the south end of the valley, the town of St. Helena grew up along the road to Calistoga. Community development was initially propelled by raising livestock, but improvements in agricultural production in the 1880's motivated landowners to subdivide and sell to agriculturists. Wheat and barley grew well in the area, as did grapes. In the mid-19th century, St. Helena became known as the "vineyard district" of Napa County.

2.2.2 WATER USAGE

The town of St. Helena, in Napa County, was established in 1876. The major economic activity in the area was winemaking. The water used for the town and the wineries was from wells tapping into the aquifer that flowed beneath the center of St. Helena. Landowners along creeks and springs also retained water rights to sustain their agricultural operations.

Recognizing the need to conserve and share water, a number of local residents assigned their water rights and portions of their land along Hudson's Creek, later renamed York Creek, to David Fulton in 1869. Their purpose was to construct a small reservoir to contain the creek which was done in April 1871. Another local resident, John York, eventually leased his rights to Fulton as well, including the flume that he had built upstream of the reservoir to irrigate his property.

In July of 1877, a group of local wine growers along York Creek filed articles of incorporation as the St. Helena Water Company, organized to supply the town of St. Helena with fresh water. The early members of the company, who all owned land along the creek, deeded portions of that land to the company. In May of 1878 construction began on a dam that would contain a 10 acre reservoir. The dam was 223 feet long, 55 feet high and 21 feet wide at the crest. Pipe was laid from the reservoir to the town and St. Helena became the first town in Napa County to have city water.

In 1882, the St. Helena Water Company met the increasing water needs of the community with improvements to the dam and reservoir. That year, they widened the base and strengthened the dam so they could raise the height 20 feet. The following year, they raised the height another 10 feet and lengthened the dam by 150 yards. To meet the ever increasing needs of the community, the St. Helena Water Company built the Upper Dam and Reservoir (project site) in 1900.

When completed in 1900, the Upper Reservoir on York Creek covered three acres and had a 10,000,000 gallon storage capacity. The earthen filled dam was 50-feet high and 140-feet long on the crest. Both faces were covered with riprap stone, and there was a culvert and 6-inch draw-off pipe through the center of the dam, with a sluice gate and screw gear for regulating the discharge from the reservoir. In 1933, a concrete spillway was built alongside the dam with a wooden flume that carried overflow into the creek.

A diversion structure was built a little over one-half mile below the Upper Reservoir, consisting of a smaller dam of rubble stone masonry that was capped with concrete. The structure diverted water restrained by the little dam into a pipeline that ran underground for 1,609 feet to the Lower Reservoir. Here it emptied into a large 30,000 gallon redwood tank. The redwood tank connected directly to the main pipes leading into town and excess water flowed into the Lower Reservoir (Eastman 2003; Hoar 1922).

The City of St. Helena purchased all lands owned by the St. Helena Water Company in 1922, including the dam, Upper and Lower Reservoirs, rights-of-way and conduits. Now having its own municipal water utility, St. Helena’s water collection, and storage facilities were more than adequate to serve their needs for some time into the future.

The Upper Reservoir Dam has not been reconstructed or altered in a major way since initial construction in 1900. A concrete spillway was added to the structure in 1933 to handle large flows through the project site. Today, the dam no longer is used for water storage as the reservoir is completely filled with sediment from upstream sources.

The future without-project conditions for water usage are expected to remain relatively unchanged for the foreseeable future.

2.3 HYDROLOGIC, HYDRAULIC, AND SEDIMENT TRANSPORT

2.3.1 HYDROLOGY

The headwaters of York Creek originate in the California Coast Range. It flows in an easterly direction, paralleling Spring Mountain Road, through a narrow canyon before joining the Napa River northeast of St. Helena. The origin of the creek is at an elevation of approximately 2,200 feet and it drops to an elevation of approximately 225 feet at its confluence with the Napa River. The drainage basin upstream of the dam covers 2.48 square miles. The basin area above the Napa River and York Creek confluence covers 5.0 square miles. The average rainfall is 35 to 40 inches per year for York Creek

The Corps’ Hydrologic Engineering Center’s (HEC) Hydrologic Modeling System (HMS) computer program was used to develop event discharges. The software was used to model the precipitation-runoff process in the watershed and obtain peak flow rates. The peak flow rates were checked against a model done by the DWR Technical Release 55 (TR-55).

There are no flow gages on York Creek. To compensate for this, mean daily flow records were obtained from nearby Nevada Creek, Adams Creek, Sulphur Creek, Dry Creek, and Santa Rosa Creek. Based on the above data, mean daily discharges were developed for York Creek. The flow duration curves would be used for fish ladder and low flow analysis.

The without-project conditions for hydrology are expected to remain relatively unchanged for the foreseeable future.

2.3.2 HYDRAULICS

Both existing and with project conditions were evaluated using the Corps' HEC River Analysis System (RAS) computer model. HEC-RAS models were used to determine channel velocities and water surface elevations. For existing conditions, channel velocities would range from 5 to 14.5 feet per second (fps) during a 1% event discharge. Channel velocities under project conditions would average 13 fps.

The without-project conditions for hydraulics are expected to remain relatively unchanged for the foreseeable future.

2.3.3 GEOMORPHOLOGY

York Creek is in reasonably good condition from a geomorphic perspective upstream and downstream from the dam site. Pools, riffles, meanders, and gravel bars are typical of streams that have been subject to limited human impacts. History of sediment removal from the site and recent history indicate that gravel supply for any restoration project is adequate.

The without-project conditions for geomorphology are expected to remain relatively unchanged for the foreseeable future.

2.3.4 SEDIMENT TRANSPORT AND DOWNSTREAM FLOODING

Under existing conditions, sediment transport capacity is highest in the steep sloped canyon reaches. Sediment transport capacity is lost as York Creek enters the Napa Valley, where the land is less steep and has less capacity to move sediment in the downstream direction. It is estimated that approximately 28,100 cubic yards of accumulated sediment is trapped behind the dam.

The existing dam traps almost the entire bed load and some of the suspended sediment from traveling to the lower portions of the watershed. These sediments range in size from fines to small boulders. Since the construction of the dam, it has captured an estimated 1,000 to 1,500 cubic yards of sediment per year. During high rainfall years (2005-2006) as much as 5,000-10,000 cubic yards of sediment can be deposited behind the dam (USACE, 2006). Likely sources of this sediment include the streambed, unnamed tributaries flowing into York Creek, runoff from viticulture areas and sediment from landslide activities.

Under existing conditions, there have been flood events along the lower portions of York Creek, where the Creek flows across the Napa Valley. In this area, York Creek is mostly channelized and does not have enough channel capacity to handle large storm events. The most recent event was during the New Year's Storm of 2005-2006. During this storm, York Creek exceeded channel capacity and flooded a Beringer Winery warehouse parking lot, vineyards, and the Culinary Institute's dorms.

Without project conditions would include the continued accumulation of sediment in the Upper Reservoir as well as continued flood events in the lower reaches of York Creek. The City is expected to occasionally remove portions of the accumulated sediment to prevent downstream releases. The City has also committed to establishing a baseline condition for sediment transport, hydrological, and flooding conditions for York Creek downstream of the project site. The City has assumed the responsibility for this need and is working to evaluate pre-project baseline conditions.

2.4 GEOTECHNICAL SITE CONDITIONS

2.4.1 GEOTECHNICAL AND GEOLOGIC CONDITIONS

Upper York Creek lies within the Coastal Range geomorphic province of California. The area is a heterogeneous mixture of intrusive, extrusive, metamorphic, and sedimentary rock. Perlitic ryholite, Serpentine, sheared shale and sandstone, a landslide and a fault are all mapped in the vicinity of the project site.

The project site generally includes a 50-foot high earthen dam, a concrete spillway and the sediments, ranging in thickness between 17 and 29 feet, that have accumulated upstream of the dam in what was once a water supply reservoir. The dam itself is built with fill consisting of sandy silt, silty sand and clayey sand mixed with gravel and cobbles overlaying serpentine bedrock. The sediment built up behind the dam is sandy silt (with clay) overlaying sand and gravel with bedrock as much as 29 feet below the surface. Downstream of the dam is serpentine bedrock which exhibited greatly varying degrees of strength when tested.

Explorations performed by Treadwell and Rollo indicate the road/pavement section at the dam is underlain by fill and then serpentinite at relatively shallow depths. The concrete spillway and left abutment of the dam are also underlain by serpentinite. The existing highway cut in the tuft is standing at about a 0.4 Horizontal (H) to 0.5 H to 1 Vertical (V) slope. The existing highway cut in the serpentine is about a 0.6 to 0.7 H to 1V slope.

The future without-project conditions for geotechnical and geologic conditions are expected to remain relatively unchanged for the foreseeable future

2.4.2 PROJECT SITE SLOPE STABILITY

There is an observed ground movement in the project area. It is bounded by the hillside to the east, Spring Mountain Road in the middle portion and the spillway and the dam towards to the west. The exact reason for the movement is unknown.

It is believed the dam provides limited lateral support to the spillway and Spring Mountain Road, which in turn tends to minimize ground movement in the area. Geotechnical slope stability analysis and deformation was performed and is described in the Geotechnical Appendix as well as in section 5.1.1.1 Environmental Consequences of the Proposes Action: Topography, Geology, and Soils of this report.

The future without-project conditions for project site slope stability are expected to remain relatively unchanged for the foreseeable future.

Figure 2.7 Spring Mountain Road Facing Upstream. (Spillway located to left of road).

2.5 ENVIRONMENTAL CONDITIONS

2.5.1 BIOLOGICAL RESOURCES

2.5.1.1 Riparian Wildlife

The forest in the vicinity of the project sites provides habitat for numerous wildlife species typical of the California Coast Ranges. Common mammals include black-tailed deer, coyote, bobcat, raccoon, and skunks. Birds include a variety of raptors and songbirds. During site visits to the Lower Diversion Structure Restoration Project, which is located downstream of York Creek Dam, DWR biologists observed red-tailed hawk, Cooper’s hawks, turkey vultures, and juvenile great horned owls, among other bird species, in the vicinity of the Upper Reservoir.

The relatively cool, moist forest surrounding York Creek Dam and Upper Reservoir also provides suitable habitat for banana slugs, observed during several site visits, and Pacific giant salamanders, indicated by the observation of one dead adult in York Creek, upstream from the Upper Reservoir, on November 19, 2001. The Upper Reservoir and a scour hole at the base of the York Creek Dam spillway contain numerous non-native bullfrogs. The signal crayfish is another non-native predator observed throughout York Creek and in the Upper Reservoir (ENTRIX 2002).

The future without-project conditions for riparian wildlife are expected to remain relatively unchanged for the foreseeable future.

2.5.1.2 Birds

There are several bird species that are "State Species of Special Concern" or "Federal Species of Concern" that have potential to occur in the vicinity of York Creek and the project site. Of these species only one of these has been noted during surveys or site visits. According to a 2002 DWR report, there is, or has been, a nesting pair of northern spotted owls about one mile upstream of the project area. The project site is located within the 1.3 mile radius that the California Department of Forestry considers to be the limit of their foraging area. However, project activities will occur at least 1 to 1.5 miles away, and, therefore, will not cause disturbance.

The future without-project conditions for birds are expected to remain relatively unchanged for the foreseeable future.

2.5.1.3 Fisheries

The Napa River basin is known to contain 27 species of freshwater fish, 14 of which are native and 13 are exotic species that have been intentionally or accidentally introduced (Stillwater Sciences, 2002; Moyle, 2002). Historically, the basin likely supported three salmonid species: chinook salmon, steelhead, and coho salmon; coho salmon are considered extirpated within the basin. Chinook salmon have been sporadically reported in the Napa River since the 1980’s; however no data on run size, timing, or origin have been collected (Pers. comm. J. Emig, 2000).

York Creek contains high quality spawning and rearing habitat and has been designated as critical habitat for threatened CCC steelhead. Surveys by the NMFS and the DFG indicate that steelhead are abundant in York Creek below the York Creek Dam. The steelhead occurring in the two miles of suitable habitat above York Creek Dam are considered a resident population of rainbow trout that could be related to steelhead in the drainage.

A 2005 Salmonid Habitat Report by the Napa County Resource Conservation District (NCRCD) found that overall, York Creek is one of the most significant spawning and rearing streams for steelhead within the Napa Basin. Specifically, the upper reaches of York Creek offer excellent rearing and spawning habitat, and creating access to these areas would greatly benefit the overall steelhead population.

The future without-project conditions for fisheries are expected to remain relatively unchanged for the foreseeable future.

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2.5.1.4 Vegetation

Upper York Creek Dam, and sediment reservoir has compromised the riparian and aquatic habitat in the project area for over 100 years. Riparian habitats immediately upstream and downstream of the project are comprised of lush riparian habitat whereas the project site riparian habitat is limited. Opportunistic riparian plants have established on the gravel bars, but many of these were washed away in a major 2005-2006 winter storm event. During the summer months, when construction will occur, summer flows meander across the top of the gravel to the drop snorkel outfall. Below is a description of the vegetation at or near the project site in May 2006. At the time of the assessment, the entire area was inundated due to recent rain events.

The habitat surrounding the project site dense to sparsely vegetated riparian and forested woodlands. The canopy is dominated by oaks, bigleaf maple, California bay, Douglas fir, willow, and white alder. The understory is sparsely to heavily vegetated. The downstream embankment is dominated by Himalaya blackberry, unidentifiable oak saplings, scotch broom, coyote brush, periwinkle, and fennel. Several medium size (6 – 8"dbh) willows and white alder occur within the sediment basin. There are a few isolated patches of emergent vegetation present, especially along the right bank. These include mostly Himalaya blackberry, willow, and white alder. Giant horsetail occurs along the edge of the impoundment in a few locations.

The future without-project conditions for the vegetation are expected to remain relatively unchanged for the foreseeable future.

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2.5.2 CULTURAL RESOURCES

The proposed project area involves one of two components of a "historic property," the York Creek Upper Reservoir Dam and Lower Diversion Structure.

These two historical resources were evaluated by an architectural historian contracted by the City of St. Helena, who determined they were eligible for listing in the National Register under Criterion A: "The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and that are associated with events that have made a significant contribution to the broad patterns of out history". These findings were documented in the Historical Resources Evaluation Report for the Proposed Removal of an Earthen Dam and Diversion Structure on York Creek near the City of St. Helena in Napa County, California, Bright Eastman, Anthropological Studies Center, and Sonoma State University.

Subsequent Section 106 (National Historic Preservation Act) consultation between the San Francisco District and the State Historic Preservation Officer (SHPO) confirmed the property's eligibility, qualifying under Criterion A at the local level of significance under the theme of community planning and development. These two major engineering features of St. Helena's water-supply system were important parts of the town's infrastructure during the early 20th century, and essential for the growth and development because they eventually provided water service to a large number of new commercial and residential properties that were being built and assured more reliable water for fire protection.

The future without-project conditions for cultural resources are expected to remain relatively unchanged for the foreseeable future.

2.5.3 HAZARDOUS WASTE BASELINE

Innovative Technical Solutions, Inc. (ITSI) conducted a soil assessment for hazardous and toxic waste at the Upper York Creek Dam, Spring Mountain Road, St. Helena, California in December 2003. They conducted tests of both the soil used in the earthen dam and in the sediment built up in the Upper Reservoir behind the dam. All the material was tested for polynuclear aromatic hydrocarbons (PAHs), organochlorine pesticides, metals, and asbestos.

According this assessment, there are no areas in the project area that require remediation prior to construction. Asbestos was found in samples of the earthen dam and sediment bed that would necessitate the adoption of best management construction practices (BMPs). This is further described in Chapter 4: Recommended Plan.

The assessment found that reuse of materials from the earthen dam for surfacing applications, e.g., roads, parking lots, near-surface filling (less than six inches deep), or use in concrete or mortar, would be prohibited. Based on low asbestos concentrations in samples of the sediment bed, the sediments require further testing prior to reuse for in surfacing applications.

The future without-project conditions for hazardous waste are expected to remain relatively unchanged for the foreseeable future.